

Dean, Ouisha <ouisha.dean@solvay.com>

GND, GNS-1, GNS-2, FRP lb/hr. emission calcs.

3 messages

Toenyes, Ouisha <ouisha.toenyes@solvay.com>

Tue, Mar 20, 2012 at 5:00 PM

To: tmartin@airsci.com

Cc: Tim Brown <Tim.Brown@solvay.com>

Hi Tim,

As discussed per our phone conversation, here are the original permit application forms for sources GND, GNS-1, GNS-2, and FRP. If you have any questions or comments please let me know. Thanks for you help.

Ouisha Toenyes Environmental Engineer (307) 872 - 6571 ouisha.toenyes@solvay.com

3 attachments







Tim Martin <tmartin@airsci.com>

Tue, Mar 20, 2012 at 6:22 PM

To: "Toenyes, Ouisha" <ouisha.toenyes@solvay.com>

Cc: Tim Brown <Tim.Brown@solvay.com>, Rodger Steen <rgsteen@airsci.com>

Ouisha,

As we discussed, the GNS, GND, and FRP sources are old diesel engine sources operated on an emergency basis (i.e., 500 hr/yr), but may need to be included in the current modeling effort. There are some existing Solvay permit forms related to these sources, but Solvay is not aware of any permits for the sources. I see only hr/yr and opacity limits in the Title V for these sources and no emissions limits. So, it appears that we will need to rely existing permit forms for Solvay as the starting point here.

I have attached a rough spreadsheet showing the values from the Solvay permit forms for GND, GNS-1, GNS-2, and FRP and my calculations checking these values. In all cases, the tpy values are calculated based on 500 hour/yr operations and I can match the calculations on the forms.

The calculations for the GNS sources are performed in a similar manner in the permit forms, but these GNS sources are engines > 600 hp. The AP-42 emission factors for engines > 600 hp are provided in AP-42 Tables 3.4-1 and 3.4-2 and are different than those used for < 600 hp engines which were used on the Solvay forms. It appears that the emission factors for the smaller engines (< 600 hp) were incorrectly used here for the 1400+ hp GNS engines. I believe that the GNS calculations should be corrected using the appropriate EFs from AP-42 section 3.4 (large engines) – and have provided what I believe to be the correct calculations (in yellow and orange). Please take a look and we can discuss.

-Tim

From: Toenyes, Ouisha [mailto:ouisha.toenyes@solvay.com]

Sent: Tuesday, March 20, 2012 4:00 PM

To: tmartin@airsci.com

Cc: Tim Brown

Subject: GND, GNS-1, GNS-2, FRP lb/hr. emission calcs.

[Quoted text hidden]

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check_gns-frp sources_03202012.xlsx 15K

Tue, Mar 20, 2012 at 6:38 PM

To: "Toenyes, Ouisha" <ouisha.toenyes@solvay.com>

Cc: Tim Brown <Tim.Brown@solvay.com>, Rodger Steen <rgsteen@airsci.com>, tmartin@airsci.com

Ouisha.

In the previous e-mail, I didn't point out that the small engine (< 600 hp) emission factors that were used for the large GNS 1 and 2 engines are all more conservative (i.e., higher) than then large engine (> 600 hp) emission factors from AP-42. This may have been intentional, but I don't know. Worst-case we are conservative if we use the emissions provided on the permit forms.

-Tim

From: Tim Martin [mailto:tmartin@airsci.com]
Sent: Tuesday, March 20, 2012 5:23 PM

To: 'Toenyes, Ouisha'

Cc: 'Tim Brown'; Rodger Steen (rgsteen@airsci.com)

Subject: RE: GND, GNS-1, GNS-2, FRP lb/hr. emission calcs.

Ouisha,

As we discussed, the GNS, GND, and FRP sources are old diesel engine sources operated on an emergency basis (i.e., 500 hr/yr), but may need to be included in the current modeling effort. There are some existing Solvay permit forms related to these sources, but Solvay is not aware of any permits for the sources. I see only hr/yr and opacity limits in the Title V for these sources and no emissions limits. So, it appears that we will need to rely existing permit forms for Solvay as the starting point here.

I have attached a rough spreadsheet showing the values from the Solvay permit forms for GND, GNS-1, GNS-2, and FRP and my calculations checking these values. In all cases, the tpy values are calculated based on 500 hour/yr operations and I can match the calculations on the forms.

The calculations for the GNS sources are performed in a similar manner in the permit forms, but these GNS sources are engines > 600 hp. The AP-42 emission factors for engines > 600 hp are provided in AP-42 Tables 3.4-1 and 3.4-2 and are different than those used for < 600 hp engines which were used on the Solvay forms. It appears that the emission factors for the smaller engines (< 600 hp) were incorrectly used here for the 1400+ hp GNS engines. I believe that the GNS calculations should be corrected using the appropriate EFs from AP-42 section 3.4 (large engines) — and have provided what I believe to be the correct calculations (in yellow and orange). Please take a look and we can discuss.

-Tim

From: Toenyes, Ouisha [mailto:ouisha.toenyes@solvay.com]

Sent: Tuesday, March 20, 2012 4:00 PM

To: tmartin@airsci.com

Cc: Tim Brown

Subject: GND, GNS-1, GNS-2, FRP lb/hr. emission calcs.

Hi Tim,

[Quoted text hidden]

SOLVAY2016_1.2_000192

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Section B: Se	ource Info	rmation
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Section B	Supplement Atta	ched? Yes	No	X
Jeeuch D	Supprement ricu	ciica. i co		

Complete one Section B form and Section B Supplement (if appropriate) for each point and area (or fugitive) source associated with the facility named in Section A of the Operating Permit Application Form. Indicate above for each Section B form completed whether a Section B Supplement is attached.

Ι.	Source Identification Number: _	GND	Source Description:	Generator - (C/S Plant)
		EG-301	-	
		20 501		
_				
2.	Source UTM Grid Coordinates:			
		Northing	Easting	
	Zana: 12 Harizantal:	_	•	907
	Zone: 12 Horizontal:	4,594,714	_ Vertical:603,	<u>891</u>

3. List all air pollution permits currently applicable to this source:

_N/A			

4. List all *State Only* requirements currently applicable to this source:

5.	Operating Schedule:hours/day* * Assume a maximum of 500 hours/year.	days/week	weeks/year*
	Is the operating schedule limited by a permit condition? Yes	NoX	
	If yes, provide the permit number:		

6. Seasonal Variation (%): Jan-Mar <u>25</u> Apr-Jun <u>25</u> Jul-Sep <u>25</u> Oct-Dec <u>25</u>

7. a. Materials used in unit (include solid fuels):

Type of Material	Process Weight Average (lb/hr)	Process Weight Maximum (lb/hr)	Maximum Quantity/Year
Diesel Fuel	8.0 gal/hr	8.0 gal/hr	4,000 gal/year

b. Products of unit:

Pro	Ma	ximum Quantity	/Year	
Electricity				
8. Design (Throughput/Fi	iring Rate/Horsepower): <u>75 KW</u>			
Site Rated Capacity	/ (if applicable): N/A			
9. Fuels Analysis (if app	pplicable):			
Amount	Heat Content	Sulfur	Ash	
Coal:	Btu/	/lb		0%
Fuel Oil: <u>4,000</u>	_Gal/yr <u>140,000</u> Btu/gal	0.05 %		
Nat. Gas:	Btu/	/ft³		
Other:	_()(_)		
10. Stack Parameters (if	f applicable):			
Stack Height:10	<u>0'</u> ft Stac	k Diameter: 0.17	_ ft	
Stack Temperature:	Stac	k Flow Rate: 100 (e	est) ACFM	
11. Control Equipment	(if applicable): None			
Pollutant	Control Equ	uipment Description		Efficiency

12. Emissions Data (attach calculations):

Air Pollutant	Potential to Emit (tons/year)	Applicable Emission Limit	Test Method
Particulate Matter	0.09	N/A	N/A
Sulfur Dioxide (SO ₂)	0.08	N/A	N/A
Nitrogen Oxides (NO _X)	1.23	N/A	N/A
Carbon Monoxide (CO)	0.27	N/A	N/A
Volatile Organic Compounds (VOC)	0.12	N/A	N/A

*	Can	Section	15
•••	766	Section	17

13.	Descri	be any limitations on operations or any work practice standard which affect emissions of any
	regulat	ed pollutant: None
14.	Source	Compliance Certification: None
	a.	Compliance method type (check as applicable):
		Emission standard Monitoring Other
		If other, please describe:
	h	Compliance Monitoring Devices: None

Air Pollutant	Compliance Monitoring Device	Brand & Model Number

Insignificant Source ID: <u>GND</u>

	c.	Other Monitoring Information: None Monitor location description:
		Generally describe the frequency and duration of sampling and how the data will be reported:
	d.	Recordkeeping: None
		Data being recorded:
		Frequency of recordkeeping:
	e.	Reporting: None
		Generally describe what is reported:
		Frequency of reporting:
		Beginning date:
15.	Enhand	ced Monitoring (Applicability will be determined when the final rule is promulgated by EPA): N/A
	a.	Is the source subject to enhanced monitoring as required by sections 114(a)(3) and 504(b) of the
		Act? Yes No If no, please continue with #14 below.
	b.	Describe the proposed enhanced monitoring protocol (EMP) for this source:
	c.	Describe the proposed test schedule for the EMP:

16. Applicable Requirements:	
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a.	Date of Construction or Last Modification of this source:	1/20/86

b. Cite the applicable requirement(s) for this source: N/A

c. Generally describe the applicable requirement(s): <u>N/A</u>

d. Applicable emission standard: N/A

17. Provide any other information necessary by any other applicable requirement (see instruction sheet):

Based on AP-42 emission factors:

Air Pollutant	AP-42 Factor (Lb/MMBtu)
Particulate Matter	0.31
Sulfur Dioxide (SO ₂)	0.29
Nitrogen Oxides (NO _x)	4.41
Carbon Monoxide (CO)	0.95
VOC	0.43

Castian	D C.ma	1000000	Attachad9	Vac	No	\mathbf{v}
Section.	o supp	lement	Attached?	res	INO	Λ

Complete one Section B form and Section B Supplement (if appropriate) for each point and area (or fugitive) source associated with the facility named in Section A of the Operating Permit Application Form. Indicate above for each Section B form completed whether a Section B Supplement is attached.

1.	Source Identification Number:	GNS	_Source Description:	Steam Plant Generators (2)
		EG-1 & 2	•	

2. Source UTM Grid Coordinates: Center of Plant

			Northing	Eastii	ng
Zone:	12	Horizontal:	4.594.769	Vertical:	603.786

3. List all air pollution permits currently applicable to this source:

N/A			
•			

4. List all *State Only* requirements currently applicable to this source:

N/A			

5.	Operating Schedule:	hours/day	days/week	weeks/year*
	* Assume a maximum of 500 ho	urs/year.		

Is the operating schedule limited by a permit condition? Yes ______ No _____ No _____ X

6.	Seasonal Variation (%): Jan-Mar	25	Apr-Jun	25	Jul-Sep	25	Oct-Dec	25

If yes, provide the permit number:

7. a. Materials used in unit (include solid fuels):

Type of Material	Process Weight Average (lb/hr)	Process Weight Maximum (lb/hr)	Maximum Quantity/Year
Diesel Fuel	168 gal/hr	168 gal/hr	84,000 gal/yr

b. Products of unit: N/A

Products				Maximum Q	uantity/	Year	
8.	Design (Throughput/Fi	ring Rate/Horsep	ower): <u>1100 K</u>	W each			
	Site Rated Capacity	(if applicable): _	N/A				
9.	Fuels Analysis (if app	olicable):					
	Amount		Heat Content		Sulfur	Ash	
	Coal:	Ton/yr	Btu/	lb			%
	Fuel Oil: <u>84,000</u>	_Gal/yr	140,000 Btu	/gal	0.05 %		%
	Nat. Gas:	10 ⁶ SCF	Btu/	ft^3			%
	Other:	. ()	()			%
10.	Stack Parameters (if	applicable):					
	Stack Height:15	;' ft	Stac	k Diameter:	0.33 ft		
	Stack Temperature:	<u>745</u> °F	Stac	k Flow Rate	e: <u>11,400</u> ACFM		
11.	Control Equipment ((if applicable):	None				
	Pollutant		Control Equ	ipment Des	ecription		Efficiency

12. Emissions Data (attach calculations):

Air Pollutant	Potential to Emit (tons/year)	Applicable Emission Limit	Test Method
Particulate Matter	1.82	N/A	N/A
Sulfur Dioxide (SO ₂)	1.71	N/A	N/A
Nitrogen Oxides (NO _X)	25.93	N/A	N/A
Carbon Monoxide (CO)	5.59	N/A	N/A
Volatile Organic Compounds (VOC)	2.53	N/A	N/A

*	See	Section	15.
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Desc	ribe any limitations on operations or any work practice standard which affect emissions of a	ny
regul	lated pollutant: None	
Sour	ce Compliance Certification: None	
a.	Compliance method type (check as applicable):	
	Emission standardMonitoring Other	
	If other, please describe:	
b.	Compliance Monitoring Devices: None	

Air Pollutant	Compliance Monitoring Device	Brand & Model Number

Insignificant Source ID: <u>GNS</u>

	c.	Monitor location description:
		Generally describe the frequency and duration of sampling and how the data will be reported:
	d.	Recordkeeping: None
		Data being recorded:
		Frequency of recordkeeping:
	e.	Reporting: None
		Generally describe what is reported:
		Frequency of reporting:
		Beginning date:
15.	Enhance	ed Monitoring (Applicability will be determined when the final rule is promulgated by EPA): N/A
	a.	Is the source subject to enhanced monitoring as required by sections 114(a)(3) and 504(b) of the
		Act? Yes No If no, please continue with #14 below.
	b.	Describe the proposed enhanced monitoring protocol (EMP) for this source:
	c.	Describe the proposed test schedule for the EMP:

16.	Applicable	Requireme	nts

- Date of Construction or Last Modification of this source: 1/20/86 a.
- b. Cite the applicable requirement(s) for this source: N/A
- Generally describe the applicable requirement(s): N/A c.

- d. Applicable emission standard: N/A
- 17. Provide any other information necessary by any other applicable requirement (see instruction sheet):

Based on AP-42 emission factors:

Air Pollutant	AP-42 Factor (Lb/MMBtu)
Particulate Matter	0.31
Sulfur Dioxide (SO ₂)	0.29
Nitrogen Oxides (NO _x)	4.41
Carbon Monoxide (CO)	0.95
VOC	0.43

Section	n B: Source Informa	ation	Section B Supple	ement Attached? Yes	No <u>X</u>
associa	ted with the facility		ement (if appropriate) for eache Operating Permit Appliement is attached.		
1.	Source Identification	on Number: FRP PU-76	Source Description:	Emergency Fire Pump	
2.	Source UTM Grid	Coordinates:			
	Zone: 12	Northing Horizontal: 4,594,711	g Easting Vertical: 603,79	<u>7</u>	
3.	List all air pollution	n permits currently applica	able to this source:		
	N/A				
4.	List all <i>State Only</i> 1	requirements currently app	plicable to this source:		
5.	* Assume a maxim	um of 500 hours/year.	ay days/w		ks/year*
	If yes, provide the p	permit number:			
6.	Seasonal Variation	(%): Jan-Mar <u>25</u>	Apr-Jun <u>25</u> Jul-Sej	p <u>25</u> Oct-Dec <u>2</u>	25
7.	a. Materials	used in unit (include solid	I fuels):		
,	Type of Material	Process Weight Average (lb/hr)	Process Weig Maximum (lb/		
Diese	el Fuel	14.5 gal/hr	14.5 gal/hr	7,250 g	gal/yr

b. Products of unit:

	Products		Maximum (Quantity/Year		
Hig	h pressure water					
8.9.	Design (Throughput/Firing Rate/Horsepower): 258 Bhp/hr Site Rated Capacity (if applicable): N/A Fuels Analysis (if applicable):					
	Amount	Heat Content	Sulfur	Ash		
	Coal:Ton/yr	Btu/lb				
	Fuel Oil: 7,250 Gal/yr	<u>140,000</u> Btu/gal	0.05 %	%		
	Nat. Gas:10 ⁶ SCF	Btu/ft ³		%		
	Other:()	()				

10. Stack Parameters (if applicable):

> Stack Height: 10' ft Stack Diameter: 0.25 ft

Stack Temperature: $\underline{500}$ °F Stack Flow Rate: 225 (est) ACFM

11. Control Equipment (if applicable): None

Pollutant	Control Equipment Description	Efficiency

12. Emissions Data (attach calculations):

Air Pollutant	Potential to Emit (tons/year)	Applicable Emission Limit	Test Method
Particulate Matter	0.16	N/A	N/A
Sulfur Dioxide (SO ₂)	0.15	N/A	N/A
Nitrogen Oxides (NO _X)	2.24	N/A	N/A
Carbon Monoxide (CO)	0.48	N/A	N/A
Volatile Organic Compounds (VOC)	0.22	N/A	N/A

*	See	Section	15.
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13.	Describ	be any limitations on operations or any work practice standard which affect emissions of any													
	regulate	regulated pollutant: None													
14.	Source Compliance Certification: None														
	a.	Compliance method type (check as applicable):													
		Emission standard Other													
		If other, please describe:													
	b.	Compliance Monitoring Devices: None													

Air Pollutant	Compliance Monitoring Device	Brand & Model Number

	c.	Other Monitoring Information: None Monitor location description:
		Generally describe the frequency and duration of sampling and how the data will be reported:
	d.	Recordkeeping: None
		Data being recorded:
		Frequency of recordkeeping:
	e.	Reporting: None
		Generally describe what is reported:
		Frequency of reporting:
		Beginning date:
15.	Enhanc	ed Monitoring (Applicability will be determined when the final rule is promulgated by EPA): N/A
	a.	Is the source subject to enhanced monitoring as required by sections 114(a)(3) and 504(b) of the
		Act? Yes No If no, please continue with #14 below.
	b.	Describe the proposed enhanced monitoring protocol (EMP) for this source:
	c.	Describe the proposed test schedule for the EMP:

16.	Applicable Requirement	S
-----	------------------------	---

- Date of Construction or Last Modification of this source: 1/20/86 a.
- b. Cite the applicable requirement(s) for this source: N/A
- Generally describe the applicable requirement(s): N/A c.
- d. Applicable emission standard: N/A
- 17. Provide any other information necessary by any other applicable requirement (see instruction sheet):

Based on AP-42 emission factors:

<u>Air Pollutant</u>	AP-42 Factor (Lb/MMBtu)
Particulate Matter	0.31
Sulfur Dioxide (SO ₂)	0.29
Nitrogen Oxides (NO _x)	4.41
Carbon Monoxide (CO)	0.95
VOC	0.43

														from tab	ble AP-42, Table 3.3-1, engines < 600 hp
Given							Diesel		PTE	PTE	PTE	PTE	PTE		AP-42 EF
		Annual	Diesel Fue	l Rate	Engine	Rating	Heat Content		PM	SO2	NOx	co	voc	PM	SO2 NOx CO VOC
Id	Source	Ops. (hr/yr)	(gal/hr)	(gal/yr)	(kW)	(hp)	Btu/gal	S Content	(tpy)	(tpy)	(tpy)	(tpy)	(tpv)		(lb/MMBtu)
GND	Generator - (C/S plant)	500	8	4000	75	100.6	140000	0.05%	0.09	0.08	1.23		0.12	0.31	0.29 4.41 0.95 0.43 << VOC is TOC + aldehydes
0.10	Generator (6/5 plant)	300	Ü	1000	,,,	100.0	1,0000	0.0570	0.03	0.00	1.23	0.27	0.12	0.51	oles in a close of the contract and chiques
AirSci Calculations			Hourly	PTE	PTE	PTE	PTE	PTE	PTE	PTE	PTE	PTE	PTF		
7 tir Ser Carcarations		Annual	Heat Rate	PM	SO2	NOx	co	VOC	PM	SO2	NOx		VOC		
Id	Source	Ops. (hr/yr)	(MMBtu/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(tpy)	(tpy)	(tpy)	(tpy)			
GND	Generator - (C/S plant)	500	1.12	0.347	0.325	4.939	1.064	0.482	0.09	0.08	1.23	0.27			
GIVE	Generator (c/3 plant)	300	1.12	0.547	0.525	4.555	1.004	0.402	ok	ok	ok	ok		check	
									OK	OK	- OK	ÜK	OK	CIICCK	
														from tob	ble AP-42, Table 3.3-1, engines < 600 hp
Given							Diesel		PTE	PTE	PTE	PTE		mom cac	AP-42 EF
Given			Diesel Fue	I Data	Engine	Datin a	Heat Content		PM	SO2	NOx	CO	VOC	PM	SO2 NOX CO VOC
		Annual												PIVI	(Ib/MMBtu)
I d GNS	Source	Ops. (hr/yr)	(gal/hr)	(gal/yr)	(kW)	(hp)	Btu/gal	S Content	(tpy)	(tpy)	(tpy)	(tpy)		0.24	
GNS	Steam Plant Generators (2)	500	168	84000	1100	1475.1	140000	0.05%	1.82	1.71	25.93	5.59	2.53	0.31	0.29 4.41 0.95 0.43 << VOC is TOC + aldehydes
														ale a consti	and the form AD 40 Telebra 2.4.4 and 2.4.2 and 2.4.2 and 2.4.5
AirSci Calculations				PTE	PTE	PTE	PTE	PTE	PTE	DTF	PTE	PTE		tnese sn	nould be from AP-42, Tables 3.4-1 and 3.4-2; engines > 600 hp
AirSci Calculations			Hourly	PIE					PIE	PTE				D0.4	AP-42 EF
		Annual	Heat Rate		SO2	NOx	CO	VOC		SO2	NOx	CO	VOC		SO2 NOX CO VOC
Id	Source	Ops. (hr/yr)	(MMBtu/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(tpy)	(tpy)	(tpy)		(tpy)	_	(lb/MMBtu)
GNS	Steam Plant Generators (2)	500	23.52	2.4	0.01	75.3	20.0	2.1	0.59	0.003					0.001 3.2 0.85 0.09 << VOC is TOC here
									check	check	check	cneck	cneck		
														from tab	ble AP-42, Table 3.3-1, engines < 600 hp
Given							Diesel		PTE	PTE	PTE		PTE		AP-42 EF
		Annual	Diesel Fue		Engine		Heat Content		PM	SO2	NOx	co	VOC	PM	SO2 NOx CO VOC
Id	Source	Ops. (hr/yr)	(gal/hr)	(gal/yr)	(kW)	(hp)	Btu/gal	S Content	(tpy)	(tpy)	(tpy)	(tpy)			(lb/MMBtu)
FRP	Emer. Fire Pump	500	14.5	7250	192.4	258.0	140000	0.05%	0.16	0.15	2.24	0.48	0.22	0.31	0.29 4.41 0.95 0.43 << VOC is TOC + aldehydes
AirSci Calculations			Hourly	PTE	PTE	PTE	PTE	PTE	PTE	PTE	PTE	PTE			AP-42 EF
		Annual	Heat Rate	PM	SO2	NOx	со	VOC	PM	SO2	NOx	CO	VOC	PM	SO2 NOx CO VOC
Id	Source	Ops. (hr/yr)	(MMBtu/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(tpy)	(tpy)	(tpy)		(tpy)		(lb/MMBtu)
FRP	Emer. Fire Pump	500	2.03	0.6	0.6	9.0	1.9	0.9	0.16	0.15	2.24	0.48		0.31	0.29 4.41 0.95 0.43 << VOC is TOC + aldehydes
									ok	ok	ok	ok	ok		